

Claims

[c1] What is claimed is:

1. An etchant composition comprising:

an NTC-1 solution prepared by mixing solution "A" comprising an organic acid, HF, and nitric acid with a 49% HF solution; and

an NTC-2 solution comprising metal ions and a strong oxidant;

wherein said NTC-1 solution and said NTC-2 solution are mixed together at a specific volume ratio.

[c2] 2. The etchant composition according to claim 1, wherein the volume ratio of said organic acid, HF, and nitric acid in the solution "A" is in a range of 1:1:4 to 1:1:25.

[c3] 3. The etchant composition according to claim 1, wherein said solution "A" and said 49% HF solution are mixed together at a volume ratio in a range of 2:1 to 5:1.

[c4] 4. The etchant composition according to claim 1, wherein said organic acid comprises formic acid, HAc, and propionic acid.

[c5] 5. The etchant composition according to claim 1, wherein said metal ions comprise copper ions, magne-

sium ions, aluminum ions, calcium ions, and zinc ions.

- [c6] 6.The etchant composition according to claim 1, wherein said strong oxidant comprises hydrogen peroxide, ozone, and sulfuric acid.
- [c7] 7.The etchant composition according to claim 1, wherein said NTC-2 solution comprises 90% hydrogen peroxide solution and copper nitrate solution with a concentration of 0.005M to 0.02M, and the volume ratio of hydrogen peroxide solution to copper nitrate solution is in a range of 2:1 to 5:1.
- [c8] 8.The etchant composition according to claim 1, wherein the specific volume ratio of said NTC-1 solution to said NTC-2 solution is in a range of 1:1 to 1:5.